The Intercontinental Journal of
Emergency Medicine

Case Report

DOI: 10.51271/ICJEM-0015

Streptococcus pneumoniae-induced meningoencephalitis presenting as rhinitis and acute stroke

Umut Ocak, Fatih Arıcılar, Recep Sami Özay, Melih Yüksel, Mehmet Oğuzhan Ay, Halil Kaya

Department of Emergency Medicine, Bursa Yüksek İhtisas Training and Research Hospital, University of Health Sciences, Bursa, Turkey

Cite this article: Ocak U, Arıcılar F, Özay, R, Yüksel M, Ay MO, Kaya H. Streptococcus pneumoniae-induced meningoencephalitis presenting as rhinitis and acute stroke. *Intercont J Emerg Med*. 2023;1(3):55-56.

Corresponding Author: Umut Ocak. drumutocak@gmail.com

Received: 01/09/2023 ◆ **Accepted**: 30/09/2023 ◆ **Published**: 30/09/2023

ABSTRACT

Meningoencephalitis, caused by streptococcus (S) pneumoniae, a gram-positive bacterium, is a potentially fatal inflammation of the brain and spinal cord with a wide range of symptoms. S. pneumoniaeis a common causative agent of meningoencephalitis, and the condition can be challenging to diagnose as its symptoms often resemble other diseases. We report a case of a 48-year-old woman with pneumococcal meningoencephalitis presenting with symptoms of rhinitis (inflammation of the nasal passages) and acute stroke, who was treated with intravenous antibiotics (ceftriaxone and vancomycin) with a favorable post-treatment outcome. This case report underscores that early diagnosis and proper treatment of meningoencephalitis are essential to improve patient outcomes, and physicians must recognize conditions like meningoencephalitis, which may mimic other diseases. Additionally, this case serves as a reminder of the important role of preventive measures, such as vaccination against pathogens such as S. pneumoniae, in reducing the incidence and impact of such infections.

Keywords: CNS infections, meningoencephalitis, stroke, rhinitis, emergency service.

1. INTRODUCTION

Meningoencephalitis caused by S. pneumoniae is a rare and potentially fatal condition that results from inflammation of the brain and spinal cord.[1] Meningoencephalitis can result from various cause including infections of the central nervous system (CNS). Streptococcus pneumoniae is a major bacterial cause of meningoencephalitis, contributing to significant morbidity and mortality worldwide.[2] Recent studies have noted the significant prevalence of meningoencephalitis caused by Streptococcus pneumoniae, emphasizing its importance on global public health. Meningoencephalitis can present with varied symptoms such as fever, headache, seizures, behavioral changes, stroke, or even death.[3,4] Accurate diagnosis is crucial for timely treatment and improved patient outcomes. Physicians should remain vigilant about atypical presentations of meningoencephalitis to ensure prompt diagnosis and treatment.

Diagnosing meningoencephalitis remains a challenge because of its diverse clinical presentation. Advances in diagnostic techniques, including molecular methods and neuroimaging, have enhanced our ability to identify meningoencephalitis etiology.[5] However, these diagnostic tools are not always readily available, especially in emergency settings. Consequently, clinical presentation and patient history remain crucial in guiding diagnostic workup and determining appropriate treatment strategies.[6]

Streptococcus pneumoniae-induced meningoencephalitis has a high mortality rate, ranging from 16% to 37%.[7] Early initiation of antibiotic therapy is vital in reducing mortality and improving patient outcomes.[8] Current guidelines recommend using third-generation cephalosporins, such as ceftriaxone or cefotaxime, in combination with vancomycin for empirical treatment .[9,10]

In this case report, we present an unusual case of pneumococcal meningoencephalitis admitted to our emergency service with symptoms resembling rhinitis and acute stroke. We aim to emphasize the importance of considering meningoencephalitis in differential diagnoses for atypical presentations and the critical role early diagnosis and treatment play in improving patient outcomes.

2. CASE

A 48-year-old woman presented to our emergency department with a history of fever, severe headache, rhinorrhea, nausea, vomiting, dysarthria, lethargy, and left hemiparesis. She had a three-year history of hypertension. Upon physical examination, the patient was alert and

This work is licensed under a Creative Commons Attribution 4.0 International License.

oriented. Vital signs revealed a temperature of 36.4 °C, heart rate of 104 beats per minute, respiratory rate of 18 breaths per minute, and blood pressure of 105/62 mmHg.

The patient exhibited post-nasal drip, left hemiparesis, a positive left Babinski sign, and decreased nasolabial fold prominence on the left side. There was no clinical indication of neck stiffness. Laboratory tests revealed elevated C-reactive protein levels (355 mg/dL) and leukocytosis. Based on the clinical presentation and initial workup, including blood tests, computed tomography (CT), and diffusion-weighted imaging (DWI), bacterial meningitis was suspected. The patient was started on a third-generation cephalosporin, ceftriaxone. Further evaluation revealed the patient's lack of vaccination against S. pneumoniae. A lumbar puncture was performed, and cerebrospinal fluid (CSF) analysis confirmed the diagnosis of pneumococcal meningoencephalitis. The patient then received intravenous vancomycin and was hospitalized for further management.

3. DISCUSSION

The literature indicates that not all patients with meningoencephalitis present with the classic triad of fever, neck stiffness, and altered mental status.[3,11] In our case, the patient's varied symptoms were consistent with reports in the literature that meningoencephalitis can manifest in diverse ways.[4] Our case underscores the importance of considering meningoencephalitis in the differential diagnosis of patients presenting with atypical symptoms such as rhinitis and acute stroke. A detailed history and physical examination are pivotal in guiding the diagnostic workup and treatment strategy.

The diagnostic approach in our case involved an initial workup with blood tests, CT, and DWI, followed by a lumbar puncture for CSF analysis. Our diagnostic approach aligns with the recommended diagnostic algorithm for encephalitis described in literature.[11,12] The importance of early diagnosis and treatment in our case is also supported by the literature, as early initiation of appropriate antibiotic therapy is crucial for improving patient outcomes.[6,8] Our case underscores the need for emergency physicians to recognize the potential for CNS infections to mimic other diseases. We highlight the need for further research on the atypical presentations of meningoencephalitis and the development of novel diagnostic and therapeutic strategies to improve patient outcomes. Additionally, the role of vaccination in preventing S.pneumoniae-induced meningoencephalitis cannot be overstated and should be considered in preventive measures. Rapid diagnosis and early treatment are vital in emergency settings, particularly for life-threatening conditions like meningoencephalitis. By considering atypical presentations and administering timely antibiotic therapy, emergency physicians can improve patient outcomes and potentially save lives.

4. CONCLUSION

In conclusion, we emphasize the importance of considering meningoencephalitis in the differential diagnosis of patients presenting with atypical symptoms, such as rhinitis and acute stroke. Our case serves as a reminder for physicians to consider meningoencephalitis in patients with atypical presentations and to employ a comprehensive diagnostic approach, including the use of advanced diagnostic techniques when available, to provide timely and effective treatment. We advocate for further research and guidelines on the role of vaccines in preventing meningoencephalitis, highlighting its clinical significance. Physicians must remain vigilant in recognizing life-threatening conditions like meningoencephalitis to provide prompt management and timely initiation of antibiotic therapy, ultimately improving patient outcomes. Given our experience and current literature, it is paramount for clinicians to remain astute and adaptable in their diagnostic approach, particularly for conditions with diverse presentations, ensuring that every patient receives the best chance for a favorable outcome.

REFERENCES

1. Graus F, Titulaer MJ, Balu R, et al. A clinical approach to diagnosis of autoimmune encephalitis. *Lancet Neurol*. 2016;15(4):391-404. doi:10.1016/S1474-4422(15)00401-9
2. Khater WS, Elabd SH. Identification of common bacterial pathogens causing meningitis in culture-negative cerebrospinal fluid samples using real-time polymerase chain reaction. *Int J Microbiol*, 2016;2016:4197187. doi.org/10.1155/2016/4197187
3. McGill F, Griffiths MJ, Bonnett LJ, et al. Incidence, aetiology, and sequelae of viral meningitis in UK adults: a multicentre prospective observational cohort study. *Lancet Infect Dis*, 2018;18(9):992-1003. doi.org/10.1016/S1473-3099(18)30245-7
4. Vilmane A, Terentjeva A, Tamosiunas PL, et al. Human parvoviruses may affect the development and clinical course of meningitis and meningoencephalitis. *Brain Sci*, 2020;10(6):339. doi.org/10.3390/brainsci10060339
5. Thigpen MC, Whitney CG, Messonnier NE, et al. Bacterial meningitis in the United States, 1998-2007. *New England J Med*. 2011;364(21):2016-2025. doi.org/10.1056/NEJMoa1005384
6. Tunkel AR, Hasbun R, Bhimraj A, et al. 2017 Infectious Diseases Society of America's Clinical Practice Guidelines for healthcare-associated ventriculitis and meningitis. *Clin Infect Dis*. 2017;64(6):e34-e65. doi:10.1093/cid/ciw861
7. Venkatesan A, Michael BD, Probasco JC, Geocadin RG, Solomon T. Acute encephalitis in immunocompetent adults. *Lancet*. 2019;393(10172):702-716. doi:10.1016/S0140-6736(18)32526-1
8. Kanaujia R, Biswal M, Angrup A, Ray P. Diagnostic accuracy of the metagenomic next-generation sequencing (mNGS) for detection of bacterial meningoencephalitis: a systematic review and meta-analysis. *Eur J Clin Microbiol Infect Dis*. 2022;41(6):881-891. doi:10.1007/s10096-022-04445-0
9. van de Beek D, Cabellos C, Dzupova O, et al. ESCMID guideline: diagnosis and treatment of acute bacterial meningitis. *Clin Microbiol Infect*. 2016;22 Suppl 3:S37-S62. doi:10.1016/j.cmi.2016.01.007
10. Solomon T, Michael BD, Smith PE, et al. Management of suspected viral encephalitis in adults--Association of British Neurologists and British Infection Association National Guidelines. *J Infect*. 2012;64(4):347-373. doi:10.1016/j.jinf.2011.11.014
11. Dorsett M, Liang SY. Diagnosis and treatment of central nervous system infections in the emergency department [published correction appears in emerg med clin north am. 2017;35(2):xix]. Emerg *Med Clin North Am*. 2016;34(4):917-942. doi:10.1016/j.emc.2016.06.013
12. Michael BD, Solomon T. Seizures and encephalitis: clinical features, management, and potential pathophysiologic mechanisms. *Epilepsia*. 2012;53 Suppl 4:63-71. doi:10.1111/j.1528-1167.2012.03615.x